A c L O n e t: A Method to Facilitate Automatic Learning-Object Assembly

William Ross, Harold Boley, and Michael Fleming

Introduction

❖ **A c L O n e t** = "Assembly from a Collaborative Learning-Object NETwork"

❖ It automatically assembles **Learning Objects** (**LO**s) into lessons, in the domain of elementary geometry.

❖ For the purpose of this poster, an **LO** is any digital resource (e.g., text, web page, or picture) that can be used to build a lesson (see Figure 1).

❖ Our approach considers the following questions:

- ❖ What metadata are needed to make semantic assembly possible?
- ❖ How would an instructor assemble a group of LOs based on these metadata?

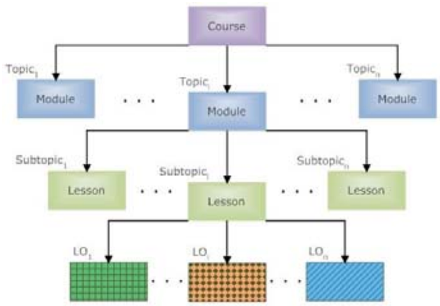


Figure 1: Course Structure

Representing LOs

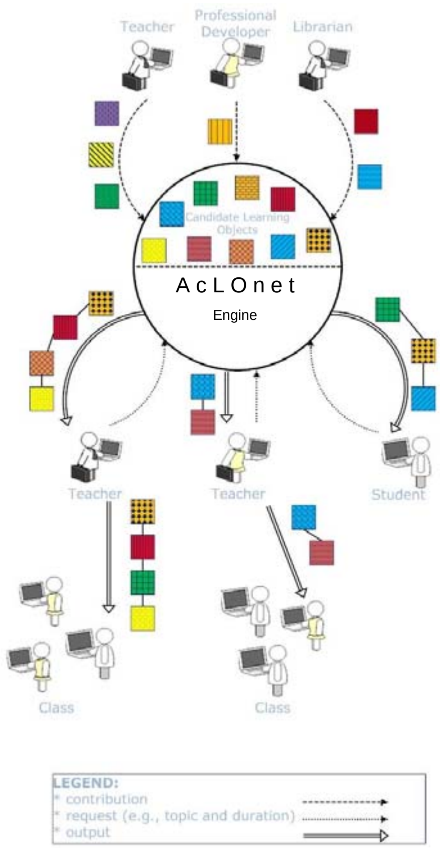
❖ **Metadata** = "data that describe other data"

❖ A c L O n e t uses an LO representation based on established standards, specifically **IEEE's LOM** (Learning Object Metadata).

❖ We found the following metadata particularly useful when attempting **automatic assembly**:

- ❖ LOM: location, typical learning time, typical age range, learning resource type (e.g., exercise)
- ❖ Other: learning objective, topic, subtopic, pre/post knowledge
- ❖ Ratings: organisation, ease of use, accuracy

Application Scenario



Assembly Process

❖ After the user selects the age level, topic, subtopic(s), duration, and learning objective(s) for a module (see Figure 2), A c L O n e t pre-filters the LOs into a **candidate set**.

❖ This set is then sorted based on topic and subtopic, using an ontology, and based on learning resource types (LRTs). E.g., Lesson LRTs appear in the following order: **narrative text**, **examples**, **exercises**, and **exam**.

❖ An LO is chosen, with a probability proportional to its **overall rating**, if more than one LO is available to satisfy any lesson's LRT slot (e.g., two exam LOs).

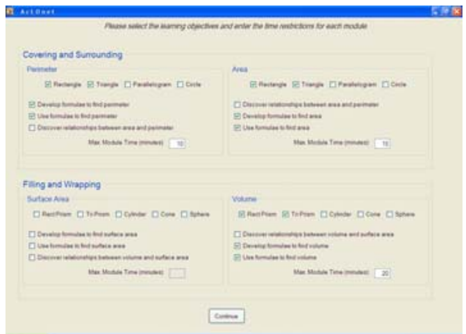


Figure 2: Screenshot from the A c L O n e t prototype written in C# (Selection Screen)

Results and Future Work

❖ The current A c L O n e t prototype can assemble four module types, based on topic and duration: **perimeter**, **area**, **surface area**, and **volume**.

❖ The final application will make fuller use of **pre/post knowledge** and **user-rating information**.

❖ The following **results** are expected:

- ❖ A c L O n e t 's solution will yield a semantically meaningful assembly (our test set already contains over 100 geometry LOs); and
- ❖ The methods used to automatically assemble geometry LOs can be applied to other learning domains, with limited changes.

Faculty of Computer Science UNB

NRC · CNRC